Upper Lillooet Hydro Project

Weekly Environmental Monitoring Report #62

Reporting Period: May 17 – May 23, 2015

Upper Lillooet River Hydroelectric Facility (Water File No. 2002561, Water licence No. C130613), Boulder Creek Hydroelectric Facility (Water File No. 2003049, Water licence No. C129969) & Transmission Line (TX Line)

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Owner Construction Permits and Approvals

Environmental Assessment Certificate No. E13-01 (Amendment 1, 2, 3, 4, 5 & 6)
Fisheries Act Subsection 35(2)(b) Authorization No. 09-HPAC-PA2-000303 (Amendment 1, 2)
Letter of Advice for the Transmission Line No. 09-HPAC0-PA2-000303
Leave To Commence Construction (ULRHEF) File No. 2002561
Leave To Commence Construction (BDRHEF) File No. 2002453
Leave To Commence Construction (TX Line) File No. 2002561/2002453
Conditional Water Licence (ULRHEF C130613) File No. 2002561
Conditional Water Licence (BDRHEF C129969) File No. 2002453
Conditional Water Licence (BDRHEF C131153) File No. 2003601
Licence of Occupation (ULRHEF #232384) File No. 2409871
Licence of Occupation (BDRHEF #232386) File No. 2409998
Licence of Occupation (TX Line #2423386) File No. 2410654
Occupant Licence to Cut (ULRHEF Amendments 1, 2, 3, 4, 5, 6, 7) No. L49717
Occupant Licence to Cut (BDRHEF – KM 38 laydown) No. L49698
Occupant Licence to Cut (BDRHEF Amendments 1, 2, 3) No. L49816
Occupant Licence to Cut (TX Line Amendment 1, 2, 3, 4, 5, 6, 7, 8, 9) No. L49697
General Wildlife Measure Exemption Approval Letter (TX Line & BDRHEF) File No. 78700-35/06 UWR and 39585-20 WHA
Heritage Conservation Act – Alteration Permit (ULRHEF) File No. 11200-03/2014-0033
Road Use Permit No. 6123-13-02 (Lillooet River FSR); 5673-13-01 (Rutherford Creek FSR); 7977-13-01 (Lillooet South FSR); 8015-13-01 (Ryan River); 8188-13-01 (Pemberton Creek FSR); and 9717-13-01 (Miller Bench FSR)
Junction Permit (ULRHEF & BDRHEF) File No. 11250-32/6123 (Amendment 1)
Aeronautical Obstruction Approval (Tx Line - Lillooet River Crossing) File No. 2013-004
Aeronautical Obstruction Approval (Tx Line - Ryan River) File No. 2013-005
Aeronautical Obstruction Approval (Tx Line - North Miller) File No. 2013-006
Aeronautical Obstruction Approval (Tx Line - South Miller) File No. 2013-007
Aeronautical Obstruction Approval (Tx Line - Pemberton Creek) File No. 2013-008
Aeronautical Obstruction Approval (Tx Line - Lillooet River near Pemberton) File No. 2013-009
Aeronautical Obstruction Approval (Tx Line - Lillooet River near Meager Creek) File No. 2013-010
Navigable Water Protection Act (ULRHEF) File No. 8200-2009-500434-001
Navigable Water Protection Act (BDRHEF) File No. 8200-2012-501-032-001
Navigable Water Protection Act (Tx Line – North Creek) File No. 8200-2013-500103-001
Navigable Water Protection Act (Tx Line – Lillooet River) File No. 8200-2013-500101-001
Navigable Water Protection Act (Tx Line – Lillooet River) File No. 8200-2013-500102-01
Navigable Water Protection Act (Tx Line – Ryan River) File No. 8200-2013-500104-001
Navigable Water Protection Act (Tx Line – South Miller River) File No. 8200-2013-500100-001
Navigable Water Protection Act (Tx Line – Boulder Creek) File No. 8200-2013-500099-001
Navigable Water Protection Act – Extension Approval (ULRHEF, BDRHEF, Tx Line)
Navigable Water Protection Act (Bridge – Ryan River) File No. 8200-2013-500381
Navigable Water Protection Act (Bridge – Upper Lillooet Side Channel; Extension Approval) File No. 8200-2013-500383
Section 57 Authorization (ULRHEF) File No. 16660-20/REC202717
SLRD Temporary Use Permit No. 34 – Boulder Creek HEF
SLRD Temporary Use Permit No. 35 – Upper Lillooet River HEF
SLRD Building Permit (10864) – Upper Lillooet River HEF Powerhouse
SLRD Building Permit (10865) – Boulder Creek HEF Powerhouse
Works Permit for Construction within FSR Right-of-Way No. 6123-14-01
Section 52(1)(b) FRPA Authorization for Ryan River Wet Crossing File No. FOR-19400-01/2014
MOTI Permit to Construct, Use and Maintain Works Upon the Right-Of-Way of a Provincial Public Highway No. 2014-06099

Contractor Construction Permits and Approvals

Magazine Licence File No. UL76018 (Renewal 1)
Section 8 Approval – Short Term Use of Water File (Lillooet River and Tributaries) No. A2006123 (Amendment 1)
Waste Discharge under the Code of Practice for the Concrete and Concrete Products Industry under the Environmental Management Act (Authorization No. 107204) Tracking No. 326969 (Renewal 1)
Wildlife Act Permits – Pacific Tailed Frog Salvage Permit # SU15-164805
BC Safety Authority – Temporary Construction Electrical Service Permit EL-140698-2014
Municipal Wastewater Regulation - Authorization # 107032
Water Supply System Construction Permits – VCH-14-613 for Main Camp
Water Supply System Permit to Operate Issued July 30th, 2014 for Main Camp
Section 6(3) and Schedule 3 Wildfire Regulations Fire Exemption for Ryan River Bridge File No. 14350-07
SLRD Building Inspection Report dated August 13, 2014 - Construction Camp Building Permit No. 10830
Lillooet River FSR Temporary Road Closures Approval File No. 11250-32/6123 (Amendment 1, 2)
Lillooet South FSR Temporary Road Closures Approval File No. 11250-32/7977
SLRD Building Permits for Mechanic Shop (10862) and Carpentry Shop (10836) dated March 18, 2015

ACRONYMS:

AMBNS	Active Migratory Bird Nesting Survey
ASMP	Archaeological Sites Management Plan
ARD M/L	Acid Rock Drainage and Metal Leaching
BCEAO	British Columbia Environmental Assessment Office
BCWQG	British Columbia Water Quality Guidelines
BDRHEF	Boulder Creek Hydroelectric Facility
BG	Background
BKL	BKL Consultants Ltd.
CE	CRT-ebc Construction Inc.
DFO	Fisheries and Oceans Canada
DS	Downstream
EAC	Environmental Assessment Certificate
EAO	Environmental Assessment Office
Ecofish	Ecofish Research Ltd.
Ecologic	Ecologic Consulting
EIR	Environmental Incident Report
ESC	Erosion and Sediment Control
FAM	Field Advice Memorandum
FSR	Forest Service Road
GWR	Mountain Goat Winter Range
Hedberg	Hedberg and Associates Ltd.
IE	Independent Engineer (True North Energy)
IEM	Independent Environmental Monitor
INX	Innergex Renewable Energy Inc.
ISW	Instream Works
ITM	Environmental Issue Tracking Matrix
JEM	JEM Energy Ltd. (Delegate Independent Engineer)
LTC	Leave to Construct
MFLNRO	Ministry of Forests, Lands and Natural Resource Operations
MOE	Ministry of Environment
MOTI	Ministry of Transportation and Infrastructure
NCD	Non Classified Drainage
OLTC	Occupational License to Cut
PAG	Potentially Acid Generating
ROW	Right of Way
RVMA	Riparian Vegetation Management Area
SES	Sartori Environmental Services
Stringer Line	Temporary Backfeed Transmission Line
TX Line	Transmission Line
ULRHEF	Upper Lillooet Hydroelectric Facility
UWR	Ungulate Winter Range
VC	Valued Component
WEL	Westpark Electric Ltd.
WEMR	Weekly Environmental Monitoring Report
WHA	Wildlife Habitat Area
WQ	Water Quality

1.0 Summary of Site Inspections for Reporting Period

The table presented below summarizes the IEM team site presence, weather and monitoring locations by component:

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
Sunday, May 17	SE, AS, AA	Periods of rain	***Construction Camp, Laydown Areas and the Lillooet River FSR*** • Ditch maintenance (including rock lining) on the Lillooet River FSR ***ULRHEF Intake*** • Drilling, blasting and excavation between downstream cofferdam and intake portal excavation • Installation of pumps and hoses for outlet sediment basins ***ULRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***ULRHEF Penstock*** • Fill and compaction works at 2+800 • Excavation at 3+325 and 4+050 – 4+075 ***ULRHEF Powerhouse*** • Rebar installation and formwork • Concrete pour ***BDRHEF Intake, Crane Pad and Access Road*** • Rock hammering and excavation above crane pad • Rope access scaling and stabilization works on right bank ***BDRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***BDRHEF Powerhouse*** • Rebar installation and formwork ***TX-Line*** • Segment 6 ➢ Groundworks for pole foundations
Monday, May 18	BA, AS, VD	Overcast	***Construction Camp, Laydown Areas and the Lillooet River FSR*** • Ditch maintenance (including rock lining) on the Lillooet River FSR ***ULRHEF Intake*** • Drilling, blasting and excavation between downstream cofferdam and intake portal excavation • Installation of pumps and hoses for outlet from sediment basins ***ULRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***ULRHEF Penstock*** • Fill and compaction works at 2+800 • Excavation at 3+325 and 4+050 – 4+075 ***ULRHEF Powerhouse*** • Rebar installation and formwork ***BDRHEF Intake, Crane Pad and Access Road*** • Rock hammering and excavation above crane pad • Rope access scaling and stabilization works on right bank ***BDRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***BDRHEF Powerhouse*** • Rebar installation and formwork • Backfill of powerhouse structure

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
			TX-Line • Segment 5 ➢ Pole stringing • Segment 6 ➢ Groundworks for pole foundations
Tuesday, May 19	BA, AS, VD	Sunny	***Construction Camp, Laydown Areas and the Lillooet River FSR*** • Ditch maintenance (including rock lining) on the Lillooet River FSR ***ULRHEF Intake*** • Drilling, blasting and excavation between downstream cofferdam and intake portal excavation • Installation of pumps and hoses for outlet sediment basins ***ULRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***ULRHEF Penstock*** • Fill and compaction works at 2+800 • Excavation at 3+325 and 4+050 – 4+075 ***ULRHEF Powerhouse*** • Rebar installation and formwork ***BDRHEF Intake, Crane Pad and Access Road*** • Rock hammering and excavation above crane pad • Rope access scaling and stabilization works on right bank ***BDRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***BDRHEF Powerhouse*** • Rebar installation and formwork • Backfill of powerhouse structure ***TX-Line*** • Segment 5 ➢ Pole stringing • Segment 6 ➢ Groundworks for pole foundations • Segment 11 ➢ Stream 261a crossing works • Segment 13 ➢ Building road 322 • Segment 14 ➢ Falling for structures 358 – 369 ➢ Building road 371.1 • Segment 15 ➢ Slashing for structures 382.5 – 380.5
Wednesday, May 20	SE, AS, VD	Sunny	***Construction Camp, Laydown Areas and the Lillooet River FSR*** • Ditch maintenance (including rock lining) on the Lillooet River FSR ***ULRHEF Intake*** • Drilling, blasting and excavation between downstream cofferdam and intake portal excavation • Installation of pumps and hoses for outlet sediment basins ***ULRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***ULRHEF Penstock*** • Fill and compaction works at 2+800 • Excavation from 4+050 – 4+075

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
			ULRHEF Powerhouse • Rebar installation and formwork ***BDRHEF Intake, Crane Pad and Access Road*** • Rock hammering and excavation above crane pad • Rope access scaling and stabilization works on right bank ***BDRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***BDRHEF Powerhouse*** • Rebar installation and formwork ***TX-Line*** • Segment 5 ➢ Pole stringing • Segment 6 ➢ Groundworks for pole foundations • Segment 7 ➢ Framing structures throughout segment • Segment 11 ➢ Stream 261a crossing works • Segment 13 ➢ Building road 322 • Segment 14 ➢ Falling for structures 358 – 369 ➢ Building road 371.1 • Segment 15 ➢ Slashing for structures 382.5 – 380.5
Thursday, May 21	SE, AS, AA	Sunny	***Construction Camp, Laydown Areas and the Lillooet River FSR*** • Ditch maintenance (including rock lining) on the Lillooet River FSR ***ULRHEF Intake*** • Drilling, blasting and excavation between downstream cofferdam and intake portal excavation • Installation of pumps and hoses for outlet sediment basins ***ULRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***ULRHEF Penstock*** • Fill and compaction works at 2+800 • Excavation from 4+050 – 4+075 ***ULRHEF Powerhouse*** • Rebar installation and formwork • Concrete pour ***BDRHEF Intake, Crane Pad and Access Road*** • Rock hammering and excavation above crane pad • Rope access scaling and stabilization works on right bank ***BDRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***BDRHEF Powerhouse*** • Rebar installation and formwork ***TX-Line*** • Segment 5 ➢ Pole stringing • Segment 6 ➢ Groundworks for pole foundations

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities

			• Segment 7
			  ➢ Framing structures throughout segment
			• Segment 11
			  ➢ Stream 261a crossing works
			• Segment 13
			  ➢ Falling for structures 313 – 316
			  ➢ Building road 322
			• Segment 14
			  ➢ Falling for structures 358 – 369
			  ➢ Building road 371.1
			• Segment 15
			  ➢ Slashing for structures 382.5 – 380.5

Friday, May 22	SE, DA, AS, AA	Overcast	***Construction Camp, Laydown Areas and the Lillooet River FSR***
			• Ditch maintenance (including rock lining) on the Lillooet River FSR
			ULRHEF Intake
			• Drilling, blasting and excavation between downstream cofferdam and intake portal excavation
			• Installation of pumps and hoses for outlet sediment basins
			ULRHEF Downstream Tunnel Portal
			• Drilling, blasting and tunnel stabilization
			ULRHEF Penstock
			• Fill and compaction works at 2+800
			• Excavation from 4+050 – 4+075
			ULRHEF Powerhouse
			• Rebar installation and formwork
			BDRHEF Intake, Crane Pad and Access Road
			• Rock hammering and excavation above crane pad
			• Rope access scaling and stabilization works on right bank
			BDRHEF Downstream Tunnel Portal
			• Drilling, blasting and tunnel stabilization
			BDRHEF Powerhouse
			• Rebar installation and formwork
			TX-Line
			• Segment 6
			  ➢ Groundworks for pole foundations
			• Segment 11
			  ➢ Stream 261a crossing works
			• Segment 13
			  ➢ Falling for structures 313 – 316
			  ➢ Building road 322
			• Segment 14
			  ➢ Falling for structures 358 – 369
			  ➢ Building road 371.1
			• Segment 15
			  ➢ Slashing for structures 382.5 – 380.5

Saturday, May 23	SE, DA	Cloud and rain	***Construction Camp, Laydown Areas and the Lillooet River FSR*** • Ditch maintenance (including rock lining) on the Lillooet River FSR. ***ULRHEF Intake*** • Drilling, blasting and excavation between downstream cofferdam and intake portal excavation

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
			ULRHEF Downstream Tunnel Portal • Drilling, blasting and tunnel stabilization ***ULRHEF Penstock*** • Fill and compaction works at 2+800 • Excavation from 4+050 – 4+075 ***ULRHEF Powerhouse*** • Rebar installation and formwork ***BDRHEF Intake, Crane Pad and Access Road*** • Rock hammering and excavation above crane pad • Rope access scaling and stabilization works on right bank ***BDRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***BDRHEF Powerhouse*** • Rebar installation and formwork • Concrete pour ***TX-Line*** • Segment 5 ➢ Groundworks for pole foundations • Segment 11 ➢ Stream 261a crossing works • Segment 13 ➢ Falling for structures 313 – 316 • Segment 14 ➢ Falling for structures 358 – 369

IEM Team Personnel: *TH – Tom Hicks; SS – Stephen Sims; BA – Blake Aleksich; VD – Vanessa Dan; AA – Anthony Andrews; AS—Anne Sutherland; DA – Danita Abraham; TJ – Tammie Jenkins; SE – Stephanie Ellis*

2.0 Administrative Summary

Key communications and meetings the IEM team had with the licensees, contractors and/or environmental authorities:

Date	Communication Type	Participants	Issues Discussed	ITM ID No.
May 19, 2015	*Email*	CE, SES, INX	CE commenced application of Calcium Chloride dust suppression product on the Lillooet River FSR from KM 38 – 48.	-
May 21, 2015	*Email*	SES, CE, INX, MFLNRO, JEM	Mountain Goat vigilance (Stage 2 behaviour) was observed on May 19, 2015 in response to blasting at the ULRHEF intake, and in response to helicopter activity in the area that was not project related. Further details are provided in the appended Mountain Goat Daily Observation Forms. Coordinating Mountain Goat monitoring at the Keyhole falls site during all blasts at the ULRHEF intake will continue during the spring kidding period (until June 15). If a Stage 3 or Stage 4 behaviour (Hyper-vigilance or Disturbance) is observed, blasting must cease until revised blasting procedures are presented to the IEM to mitigate the	-

Date	Communication Type	Participants	Issues Discussed	ITM ID No.
			potential for additional Mountain Goat disturbances.	
	Site survey	CE, SES	SES conducted a modified AMBNS of two trees at the BDRHEF intake that required falling for safety reasons. The trees were within the OLTC boundary and no nests or nesting activity were observed during the 0.5 hr modified AMBNS. SES granted approval onsite to clear the two trees.	-
May 22, 2015	*Email*	Ecofish, INX, CE, SES	During an AMBNS and site assessment of the permanent PAG stockpile location Ecofish recorded the presence of a bear denning site at the edge of the proposed area. Given its location and the available information on Black Bear dens, Ecofish recommended a 20 meter no disturbance buffer between the den and the western edge of the PAG stockpile boundary.	-
	Pre-work meeting	INX, SES, CE	Review of the ULRHEF intake tunnelling and upstream portal Work Plan and status of the ULRHEF intake settling ponds. No drilling will occur at the face of the tunnel portal until the design engineer provides confirmation that the settling ponds were built to design specifications, oil/water separator is installed, and pH treatment and flocculant injection systems are incorporated into the design.	-
May 23, 2015	*Email*	BKL, SES, CE, INX	BKL analysis of noise monitoring data recorded near the ULRHEF downstream tunnel portal indicated that two blasting events caused minor exceedances of the 75dbA noise level threshold. The first event occurred around 13:25 on May 18, 2015 (max = 75.6 dbA; duration = 10 seconds), and the second event occurred around 01:46 on May 20, 2015 (max = 79.9 dbA; duration = 6 seconds). As a corrective measure, CE will ensure future blasts are configured with fewer holes per delay and longer delays between sets.	-
	Email	CE, INX, SES, Ecofish	Ecofish confirmed the presence of CTF in a watercourse that flows along the edge of the proposed PAG stockpile area. A 30m no disturbance buffer was flagged along the riparian area of this watercourse prior to clearing vegetation from the future PAG stockpile area.	-

3.0 Current Work Restrictions and Timing Windows

The table presented below outlines work restrictions applicable during the reporting period for each active Project component location:

Component	Location	Wildlife/Archeology Concern	Construction/Timing Restrictions & Mitigations
All Project Areas	TX Line, ULRHEF, & BDRHEF	Active Migratory Bird Nesting Period	AMBNSs must occur prior to clearing vegetation in all Project areas according to the survey schedule and methods outlined in the Project's Active Migratory Bird Nest Survey Plan during the nesting period (May

Component	Location	Wildlife/Archeology Concern	Construction/Timing Restrictions & Mitigations
			1 – July 31). All nests identified as active must be protected by a minimum 30m no disturbance buffer until the nest is no longer deemed to be active by a QP (buffer distances vary by species; further details are provided in the Active Migratory Bird Nest Survey Plan).
TX Line	Segments 8 – 15	Within 150m of wetlands or 100m of Coastal Tailed Frog Streams	IEM presence is required when clearing within 150m of wetlands or 100m of CTF Streams, to ensure clearing areas are minimized.
		Riparian Vegetation Management Areas (RVMA)	IEM monitoring is required during clearing within RVMAs.
		Surface Water Quality	IEM monitoring is required during culvert installation activities in non-fish bearing waters to document adherence to the Surface Water Quality Protection Plan objectives.
		Suitable Raptor Nesting Habitat	IEM presence is required when clearing within suitable Northern Goshawk (NOGO), SPOW (Spotted Owl) and Western Screech-Owl (WESO) nesting habitat during the breeding period. A QP is to complete a nest survey if working within 600m of suitable Peregrine Falcon (PEFA) nesting habitat during the breeding period.
		Suitable Class 1 & 2 Grizzly Bear forage habitat	IEM monitoring is required when clearing within identified Class 1 & 2 Grizzly Bear forage habitat, to ensure clearing areas are minimized.
		Wildlife Habitat Area (WHA) 2-399	Construction of the transmission line within the Grizzly Bear WHA 2-399 must be constructed outside of April 1 to June 15 and October 15 to December 31 to minimize disturbance to Grizzly Bears expected to use the WHA during spring and fall.
		Ryan River Drainage	Construction of the TX Line into and across the Ryan River drainage will occur during the less critical Grizzly Bear summer foraging period (June 1 – September 1).
		Moose, Deer, & Mountain Goat UWRs	Helicopter flight paths will avoid UWRs and landing locations will be located further than 500m away from the UWRs during the sensitive late winter period (March 1 – May 15).

Component	Location	Wildlife/Archeology Concern	Construction/Timing Restrictions & Mitigations
Lillooet River FSR & ULRHEF	Access roads above the lower limit of the 200m buffer Truckwash Creek Migration Corridor to the ULRHEF intake	Mountain Goat UWR & Migration Corridor	Daily construction shutdowns occurred throughout the reporting period beginning one hour before and two hours after sunrise as well as two hours before and one hour after sunset. This timing restriction is effective within the Migration Corridor and 200m buffer throughout the month of May. Noise levels monitoring is occurring near the downstream portal at two monitoring stations within the Truckwash Creek migration route, as well as one location at the ULRHEF intake with guidance from an acoustical consulting firm. If noise levels exceed 75 dBA at the edge of UWR u-2-002 UL 11 or the migration corridor during the critical winter (Nov 1 - Apr 30) and kidding (May 1 - Jun 15) periods, additional mitigation measures are to be implemented to minimize noise levels. If a goat observation occurs within 500 m line-of-sight of construction activities, construction must cease for at least 48 hours. The IEM must record and submit all goat observations to FLNR within 48 hours.
ULRHEF & BDRHEF	BDRHEF intake	Mountain Goat UWR habitat (u-2-002 UL 12)	During winter construction and operations (November 1 – June 15), access to Boulder Creek HEF intake must be gated at least 500 m from the original UWR u-2-002 UL 12 to restrict motorized use within the UWR, unless otherwise directed by FLNR. Noise levels are monitored during active construction between May 1 – June 15 within UWR u-2-002 UL 12. The noise level monitoring location is between the intake work area and the portion of the UWR with the highest documented use. If noise levels exceed 75 dBA at this location, activities will cease until additional mitigation measures are proposed and implemented to minimize the possibility of additional noise level exceedances.

4.0 Upper Lillooet River HEF – Monitoring Results

4.1 *Construction Camp, KM 38 Laydown & Lillooet River FSR*

Activities:

- Calcium chloride for dust suppression applied to Lillooet River FSR from KM 37.5 to KM 45 and on Project access roads (Photo 1).
- Ditch maintenance (including rock armouring) on the Lillooet River FSR at KM 49.25 (Photo 2).

- Routine maintenance of construction equipment within the mechanic shop and fuel management continued at the KM 38 laydown.
- The electric fences were maintained and operational throughout this reporting period.

Environmental Summary:

- Calcium chloride application occurred on Project roads during this reporting period as a dust suppression measure (Photo 1). To prevent application near watercourses, CE's environmental management team flagged an 8m buffer on either side of each tributary crossing and sections of road within 8m of the Lillooet River. The rate of application did not exceed 1.1 kg/m^2 as approved by the IEM.
- No environmental issues were observed during this reporting period at the construction camp, KM 38 laydown or on the Lillooet River FSR.

Photos:

Photo 1 – Calcium chloride applied to Lillooet River FSR at KM 38 for dust suppression (May 19, 2015).

Photo 2 – Ditch maintenance completed at KM 49.25 on the Lillooet River FSR (May 19, 2015).

4.2 *Intake (North & South Sides), Access Roads and Upstream Tunnel Portal*

Construction Activities:

- Drilling, blasting and excavation at the upstream tunnel portal excavation (Photo 3, Photo 4 and Photo 5).
- Dewatering of portal excavation to the intake dewatering and wastewater treatment system (Photo 6 and Photo 7).

Environmental Summary:

- Drill and blast works continued at the ULRHEF intake during this reporting period. Drilling and blasting occurred within 500m of the Keyhole Falls Mountain Goat kidding range under the following conditions:
  - Noise suppression measures (delays, charge weights, blast mats, etc.) be used,

  - Noise levels remain below 75 dBA (measured at Keyhole Falls monitoring location), and
  - The blast schedule was provided to the IEM to allow for goat monitoring to occur during the blasts.

- Mountain goat vigilance (Stage 2 behaviour) was observed on May 19, 2015 in response to blasting at the ULRHEF intake, and in response helicopter activity in the area that was not project-related. Although the blast did not exceed the 75dbA noise level threshold, a mountain goat observed from the Keyhole Falls monitoring station showed signs of vigilance by staring in the direction of the blast for a prolonged period. Coordinating mountain goat monitoring at the Keyhole Falls site during all blasts at the ULRHEF intake will continue during the spring kidding period (until June 15). If a Stage 3 or Stage 4 behaviour (Hyper-vigilance or Disturbance, respectively) is observed, blasting must cease until revised blasting procedures are presented to the IEM to mitigate the potential for further mountain goat disturbances. See the appended Daily Mountain Goat Observation Forms for further details.
- Operation of the ULRHEF intake dewatering and wastewater treatment system continued during this reporting period (Photo 6 and Photo 7). During site inspections on May 17 and again on May 22, the IEM and CE's environmental manager observed turbid water (907 AU at 17:00) pumping directly to the Lillooet River from the upstream tunnel portal excavation (Photo 8). During both instances, CE's environmental manager immediately redirected turbid water to the sediment basins and discussed the omission with the site supervisor. The IEM conducted water quality sampling and confirmed that discharge did not cause elevated turbidity downstream of the intake during either of the two instances (Please see Section 4.6 Water Quality Results); however, this demonstrated the need for a dedicated person to monitor water being directed to the Lillooet River at all times. CE has now established a dedicated person on day shift and night shift to monitor the pumps within the intake structure and tunnel portal excavation at all times. This person has the responsibility of directing all turbid water to the sediment ponds and must verify with CE environmental staff or the IEM prior to directing any water to the Lillooet River.
- The IEM was onsite to monitor all blasts and construction activities within 30m of the Lillooet River.

Photos:

Photo 3 – Current conditions at the ULRHEF intake (May 18, 2015).

Photo 4 – ULRHEF upstream portal excavation (May 18, 2015).

Photo 5 – Blast preparation between upstream portal excavation and downstream cofferdam (May 18, 2015).

Photo 6 – Dewatering ULRHEF upstream portal excavation to sediment basins (May 18, 2015).

Photo 7 – ULRHEF intake sediment basins (May 18, 2015).

Photo 8 – Sediment-laden water discharged to Lillooet River (May 17, 2015).

4.3 *Downstream Tunnel Portal*

Construction Activities:

- Drilling, blasting, mucking and stabilization works within the tunnel (Photo 9).
- Dewatering to downstream portal settling ponds (Photo 10 and Photo 11).

Environmental Summary:

- Tunnelling works and dewatering to the downstream portal settling ponds continued during this reporting period (Photo 10 and Photo 11). The settling pond water infiltrated to ground in the first cell with no discharge to the surrounding environment.
- BKL analysis of noise monitoring data recorded near the ULRHEF downstream tunnel portal indicated that two blasting events caused short duration minor exceedances of the 75dbA noise level threshold. The first event occurred at 13:25 on May 18, 2015 (max = 75.6 dbA; duration = 10 seconds), and the second event occurred at 01:46 on May 20, 2015 (max = 79.9 dbA; duration = 6 seconds). As a corrective measure, CE will ensure future blasts are configured with fewer holes per delay and longer delays between sets.

Photos:

Photo 9 – Tunnel mucking at ULRHEF downstream tunnel portal (May 18, 2015).

Photo 10 – Dewatering ULRHEF downstream tunnel portal to oil water separator (May 18, 2015).

Photo 11 – ULRHEF downstream tunnel portal settling ponds (May 18, 2015).

4.4 *Penstock*

Construction Activities:

- Fill and compaction works continued at 2+800 (penstock chainage).
- Penstock excavation continued at 3+325 and from 4+050 to 4+075 (Photo 12 and Photo 13).

Environmental Summary:

- Heavy rock truck traffic on the penstock alignment caused silt fencing at the ASTR03 and ASTR04 tributary crossing to become infilled and damaged. CE repaired the silt fencing and installed new sections where appropriate (Photo 14 and Photo 15). The fencing repair and replacement will prevent sediment from entering the watercourses.
- On May 23, Ecofish conducted a CTF presence/absence survey at a watercourse adjacent to a proposed PAG stockpile area near KM 42 on the Lillooet River FSR (Photo 16). The presence of CTF tadpoles was confirmed (Photo 17) necessitating a 30m protective buffer from the watercourse. A terrestrial salvage will not be necessary for clearing activities with the 30m buffer in place.

Photos:

Photo 12 – Penstock bulk excavation at 3+325 (May 18, 2015).

Photo 13 – Penstock bulk excavation at 4+060 (May 19, 2015).

Photo 14 – Silt fencing repaires at ASTR03 crossing (May 19, 2015).

Photo 15 – Silt fencing repaired at ASTR04 crossing on Truckwash 2 access road (May 17, 2015).

Photo 16 – Ecofish conducted a CTF presence/absence survey near KM 42 of the Lillooet River FSR (May 23, 2015).

Photo 17 – Coastal tailed frog tadpoles captured during presence/absence survey (May 23, 2015).

4.5 *Powerhouse & Access Road*

Construction Activities:

- Continued rebar installation and formwork for the powerhouse structure (Photo 18).
- Structural concrete pours occurred on May 17 and May 21 (Photo 19).
- Dewatering from the powerhouse sump to the Lillooet River continued (Photo 20 and Photo 21).

Environmental Summary:

- On May 17, the IEM was onsite to inspect the ULRHEF powerhouse and verify water quality within the dewatering sump during the concrete pour (Photo 19). The IEM sampled the water discharging from the powerhouse sump at 17:15 (Photo 21), which had a pH of 8.5 and was suitable for discharge to the surrounding environment as per the Surface Water Quality Protection Plan.
- Dewatering of the ULRHEF powerhouse continued without environmental concern throughout the reporting period. The IEM will continue to monitor the works area to confirm that future concrete pours are adequately isolated from flowing water and protected from precipitation during curing.

Photos:

Photo 18 – Rebar installation and formwork at the ULRHEF powerhouse (May 19, 2015).

Photo 19 – Concrete pour at ULRHEF powerhouse (May 17, 2015).

Photo 20 – ULRHEF powerhouse sump (May 19, 2015).

Photo 21 –ULRHEF powerhouse sump dewatering to Lillooet River (May 19, 2015).

4.6 *Water Quality Results*

The following table presents the results of the routine water quality sampling program for the ULRHEF. The IEM is undertaking a weekly monitoring program according to the conditions outlined in the Surface Water Quality Protection Plan. The regular monitoring sites quantify WQ conditions within the Lillooet River upstream and downstream of active construction areas. The IEM acknowledges the natural variability of instream WQ conditions in the Lillooet River due to seasonal melt fluctuations and large tributary inputs. In the event that an exceedance of *in-situ* water quality (turbidity or pH) is deemed to be caused by project-related activities, the IEM will highlight the exceedance, discuss the cause, and outline measures undertaken by the Contractor to correct the issue. When an exceedance cannot be attributed to project related activities, the exceedance will be marked by an asterisk (*).

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (*u*S)	Temp (°C)
Routine Water Quality						
May 22, 2015	17:25	ULR Background – ULRHEF Intake	7.5	56.6	51	11.3
	17:18	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	7.7	49.6	49	11.0
	17:55	ULR # 1 – Upstream of ULRHEF Powerhouse	6.5	44.8	48	11.1
	11:33	ULR #2 – Downstream of ULRHEF Powerhouse between KM 40.5 and KM 41	7.4	60.0	51	7.0
	13:30	ULR #3 – Lillooet River FSR KM 38 Laydown – D/S of Boulder confluence	6.5	42.0	51	9.2
	8:05	ULR #4 – Lillooet River FSR KM 24 – D/S of all works and Meager confluence	7.6	**145.0***	51	9.5

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (*u*S)	Temp (°C)
Water Quality for Specific Works						
ULRHEF intake						
May 17, 2015	9:45	In dewatering system sump following redirection of water to sediment basins	-	61.9	-	-
	9:55	Background above intake	-	35.9	-	-
	10:05	Lillooet River at Keyhole bridge	-	38.1	-	-
May 22, 2015	17:00	Water pumped directly to the Lillooet River	-	**907 AU**	-	-

* Increased turbidity due to Meager Creek influence and not Project related

4.7 *Recommendations*

IEM recommendations for the ULRHEF are as follows:

- All seepage water in the portal excavation should be conveyed to the sediment basins unless approved for discharge directly to the Lillooet River by the IEM or CE environmental manager.
- The IEM recommends that the access roads and tributaries on the penstock alignment be monitored regularly to ensure that no ESC issues develop with the continued excavation/fill works and rock truck traffic.
- The ULRHEF powerhouse sump water should be monitored regularly. Alkaline or turbid water should be pumped to the remaining settling ponds for treatment.

4.8 *Upcoming Works*

The following new and/or environmentally sensitive construction activities are scheduled to occur at the ULRHEF in the upcoming reporting period(s):

- Drilling and blasting will continue at the ULRHEF intake.
- Dewatering of the upstream portal excavation will continue.
- Tunneling activities will continue at the ULRHEF downstream tunnel portal.
- Excavation will continue on the ULRHEF penstock alignment.
- Rebar installation, formwork and concrete pours will continue at the ULRHEF powerhouse.

5.0 Boulder Creek Hydroelectric Facility – Monitoring Results

5.1 *Intake Access Road & Crane Pad*

Construction Activities:

- Rope access scaling and slope stabilization works on the intake right bank (Photo 22).

- Rock hammering and excavation continued above the intake crane pad (Photo 23 and Photo 24).

Environmental Summary:

- During rock hammering and consolidation activities at the crane pad and right bank, an unquantified volume material fell on the right bank (above high water mark) and into Boulder Creek despite the best efforts of CE. The material is mainly rock and water quality impacts to Boulder Creek have not been observed to date. The material that has fallen from the crane pad is mostly within the intake work area and will be removed during construction of the intake structure.
- Noise monitoring continued from a station 375m northwest of the BDRHEF intake within the identified UWR (UL-11). Noise level monitoring was conducted to ensure that the 75 dBA noise level threshold is not exceeded as outlined in the Mountain Goat Management Plan.
- The gate to restrict public access on the BDRHEF intake access road within 500m of UWR was operated daily during this reporting period.

Photos:

Photo 22 – Rope access crews conduct scaling works on the right bank at the BDRHEF intake (May 18, 2015).

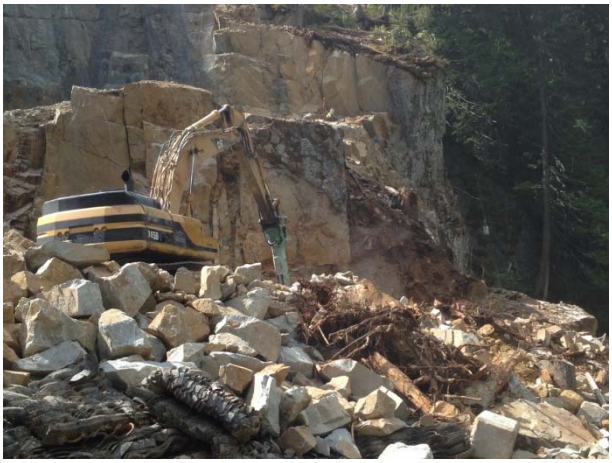

Photo 23 – Rock hammering continued at the BDRHEF intake (May 18, 2015).

Photo 24 – Rock hammering and excavation at the intake (May 24, 2015).

5.2 *Downstream Tunnel Portal and Powerhouse*

Construction Activities:

- Rebar installation and formwork for the powerhouse structure continued (Photo 25).
- Backfill works at the powerhouse.
- A structural concrete pour was completed at the powerhouse on May 23 (Photo 26).
- Drilling, blasting, mucking and stabilization works continued within the tunnel (Photo 27).
- Dewatering of the tunnel and powerhouse to the oil water separator and settling ponds continued (Photo 28).

Environmental Summary:

- No environmental issues were observed during this reporting period at the BDRHEF powerhouse or downstream tunnel portal.

Photos:

Photo 25 – Current conditions at the BDRHEF powerhouse (May 19, 2015).

Photo 26 – Tarp over uncured concrete at BDRHEF powerhouse (May 23, 2015).

Photo 27 – Current conditions at the BDRHEF tunnel portal (May 19, 2015).

Photo 28 – BDRHEF powerhouse settling ponds (May 19, 2015).

5.3 *Water Quality Results*

The following table presents the results of the routine water quality sampling program for the BDRHEF. The IEM is undertaking a weekly monitoring program according to the conditions outlined in the Surface Water Quality Protection Plan. The regular monitoring sites have been selected to quantify WQ conditions within the Lillooet River upstream and downstream of active construction areas. The IEM acknowledges the natural variability of instream WQ conditions in Boulder Creek due to seasonal fluctuations in snowmelt. In the event that an exceedance of *in-situ* water quality (turbidity or pH) is deemed to be caused by project-related activities, the IEM will highlight the exceedance, discuss the cause, and outline measures undertaken by the Contractor to correct the issue. When an exceedance cannot be attributed to project related activities, the exceedance will be marked by an asterisk (*).

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (uS)	Temp (°C)
Routine Water Quality						
May 22, 2015	-	**BDR BG** – Upstream of BDRHEF intake *not currently accessible*	-	-	-	-
	-	**BDR #1** – Downstream of BDRHEF intake *not currently accessible*	-	-	-	-
	12:40	**BDR #2** – Upstream of BDRHEF Powerhouse	6.9	37.3	42	7.3
	9:40	**BDR #3** – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	7.4	28.4	38	6.1

5.4 *Recommendations*

IEM recommendations for the BDRHEF are as follows:

- All wastewater related to the BDRHEF tunnelling works should continue to be contained and conveyed to the downstream portal settling ponds for treatment. Regular inspections of the treatment ponds should be performed to ensure the necessary maintenance activities outlined in the work plan are performed.
- CE should continue to exercise caution when working at the BDRHEF crane pad and on slope consolidation to prevent excessive rock fall into Boulder Creek.

5.5 *Upcoming Works*

The following new and/or environmentally sensitive construction activities are scheduled to occur at the BDRHEF in the upcoming reporting period(s):

- Scaling and stabilization works on the BDRHEF intake right bank will continue.
- Rock hammering and excavation at the intake will continue.
- BDRHEF downstream portal tunnelling works will continue.

6.0 Transmission Line – Monitoring Results

6.1 *Transmission Line Construction Activities*

Right-of-Way Clearing:

- Hand falling in Segment 13 from structures 313 – 316.5.
- Hand falling in Segment 14 from structure 358 – 369.

Existing Road Upgrades and Access Road Construction

- Building road 322.1 (including culvert installations) in Segment 13 (Photo 29, Photo 30 and Photo 31).
- Stream 261a crossing works in Segment 11 (Photo 32).
- Building road 371.1 in Segment 14.

Transmission Line Pole Installation, Line Stringing and Clipping

- Stringing poles in Segment 5.
- Groundworks for pole foundations in Segment 6.
- Framing structures in Segment 7.

Environmental Summary:

- On May 20, the IEM was present for a wet culvert installation on road 322.1 in Segment 13 (Photo 29, Photo 30 and Photo 31). Worksite isolation was achieved with dam/sump and pump methods and the culvert installation works were completed in the absence of flowing water. Crews took care to minimize downstream sedimentation by minimizing disturbance to surrounding soil. During the culvert installation, a temporary pulse (<20 minutes) of suspended sediment was experienced when water was released to the new culvert. The IEM conducted water sampling during the culvert installation (see Section 5.2 **Error! Reference source not found.**).
- On May 21, a Hitachi 225 excavator outfitted with biodegradable hydraulic oil completed one crossing of stream 261a (Photo 32). Logs were placed in the stream to keep the excavator above the water while it crossed to minimize impact to the stream bed and downstream water quality. The IEM was present to monitor the crossing. No impact to downstream water quality were observed.
- The IEM was present as required when clearing activities occurred within 150m of wetlands, 15m RVMAs (30m for CTF streams), 100m of Coastal Tailed Frog Streams, Class 1 & 2 suitable Grizzly Bear WHA and/or suitable forage habitat, moose and deer UWR, legally designated Old Growth Management Areas (OGMAs) or within Northern Goshawk, Spotted Owl or Western Screech-Owl nesting habitat (during breeding season). All flagged boundaries were respected during clearing activities. No environmental issues were observed.

Photos:

Photo 29 – Pump prepared for culvert installation on road 322.1 in Segment 13 (May 20, 2015).

Photo 30 – Culvert installation on road 322.1 in Segment 13 (May 20, 2015).

Photo 31 – Culvert installation on road 322.1 in Segment 13 (May 20, 2015).

Photo 32 – Excavator crossing stream 261a (May 21, 2015).

6.2 *Water Quality Results*

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (uS)	Temp (°C)
Culvert installations on road 322.1 in Segment 13						
May 20, 2015	9:30	Background above works	-	0.50	-	-
	10:47	5m downstream of works following release of flow to culvert	-	**13.6**	-	-
	11:05	5m downstream of works	-	4.31	-	-
	11:20	5m downstream of works	-	4.87	-	-

6.3 *Recommendations*

- The IEM has no recommendations at this time.

6.4 *Upcoming Works*

The following new and/or environmentally sensitive construction activities are scheduled to occur along the TX Line in the upcoming reporting period(s):

- Stringing poles in Segment 5.
- Groundworks for pole foundations in Segment 6.
- Framing in Segment 7.
- Stream 261a crossing works in Segment 11.
- Hand falling in Segment 12 and 13.
- Road construction in Segment 13 and Segment 14.

7.0 Wildlife Sightings

As per the CEMP, a wildlife sightings record has been implemented and will be updated regularly by Project Personnel. It is mandatory for all personnel to report wildlife sightings including, but not limited to bears, cougars, mountain goats and deer. Wildlife sighting will be reported and recorded by the contractor(s). Wildlife Observation forms will be included in first reporting period following month end. Observation or detection of the following species will trigger notification to identified parties according to the following table.

Species Observed or Detected	Notification Period	Agencies to be Notified
Northern Rubber Boa	Immediately	IEM, Owner
Grizzly Bear	24hrs	IEM, Safety Officer, Conservation Officer, Owner
Wolverine Den	24hrs	IEM, MFLNRO, Owner
Spotted Owls	24hrs	IEM, MOE, Owner
Mountain Goats	48hrs	IEM, MFLNRO, Owner

8.0 Mountain Goat Monitoring Program

The following mitigation measures were implemented for work activity within the Migration Corridor during this monitoring period:

- Daily dawn and dusk shutdowns as outlined in the Mountain Goat Management Plan were followed.
- Noise level monitoring to ensure that the 75db noise level threshold is not exceeded as outlined in the Mountain Goat Management Plan.
- As of May 1, the IEM or designate was on site to monitor mountain goat activity within 500m of construction activities at the ULRHEF intake and the ULRHEF downstream tunnel portal. Mountain goats were monitored from three sites:
  - Truckwash Creek viewing river right of the Migration Corridor– MG-OBS01 (10U 467955 5612773):

- Keyhole Falls viewing the south side u-2-002 UL11 – MG-OBS02 (10U 466593 5613988); and,
- Garibaldi Pumice mine site viewing u-2-002 UL 19 – MG-OBS03 (10U 467388 561408).

Monitoring effort was split between all three sites between sunrise and sunset, unless safety concerns or weather conditions precluded monitors from doing so. The order of site visits rotated daily. Construction activities need to cease if a goat(s) are observed moving towards the ULRHEF intake and/or if a goat(s) are observed within a 500m line of site of a construction activity. No goats were observed within 500m line of sight of construction activities and no work stoppages were required.

Please refer to the attached Mountain Goat Monitoring Daily Observation Forms for a summary of observations from this reporting period.

9.0 Environmental Issues Tracking Matrix (ITM)

9.1 *Hydroelectric Facilities (ULRHEF & BDRHEF)*

ITM Tracking Legend:	*Work Item Open*
	Work Item Complete
	Issue Closed

Issue Tracking		Environmental Issue		Mitigation Measures			
ID No.	Status	Location	Issue Description	Action Taken/Recommended	Date of Identification	Targeted Date for Completion	Date Completed
							next ITM – ULR#25

9.2 *Transmission Line*

ITM Tracking Legend:	*Work Item Open*
	Work Item Complete
	Issue Closed

Issue Tracking		Environmental Issue		Mitigation Measures			
ID No.	Status	Location	Issue Description	Action Taken/Recommended	Date of Identification	Targeted Date for Completion	Date Completed
							No outstanding environmental issues (next ITM – Tx#3)

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): Anne Sutherland

Date (YYYY-MM-DD): 2015-05-17

Weather (*cloud cover,* precipitation *and temperature*): Cloudy, light rain -am., rain pm.

sartori environmental services

106-185 forester street, north vancouver, bc v7h 0a6
office tel 987.5588 fax 987.7740

Please submit **Mountain Goat Daily Observation Form** in person to a representative of Sartori Environmental Services (**Tom Hicks** or **Stephen Sims**) or by email to **tom@sartorienv.com** following each day of monitoring.

Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates *(approximate center of observation area)*	Daily Start Time *(24hr clock)*	Daily End Time *(24hr clock)*
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	09h10	11h00
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	13h45	15h30
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	11h15	13h30

Daily form #	1	of	1

If more space is needed in the below table, please fill out additional daily forms and indicate total number of forms above.

Observation Site *(indicate if location other than OBS site)*	Time *(use 24hr clock)*	UTM Coordinates or Waypoint *(10U)*	Species Observed *(indicate Mountain Goat or other species)*	Observations *(be specific - visual sign, track, other sign)*	Total # of Animals	Age/Sex *(if unknown - refer to attached info sheet)*	Description of Activities *(feeding, moving, etc.)*	Comments *(habitat, snow conditions, etc.)*	Photo #s
MG - OBS01	09h35	467898 5613967	N/a	N/a	N/a	N/a	N/a	No visible goats	
MG - OBS03	12h45	469155 5614960	MG	Visual	2	2 adults, 1 billy, 1 u/k	Resting for 20 minutes, then got up and moved downslope, started to feed. 2nd adult was rubbing his body on rocks and throwing his head around,	These goats are located in the snow slide area above rock bluff. The billy was covered in dark bare patches on his back, sides and legs? Shedding?	
MG - OBS02	13h50	466760 5613967	MG	Visual	3	1 nanny 1subadult 1 yearling	First hour of observation they were all lying down and resting. Nanny changed position once and spent time ruminating while lying down.	It had been raining quite hard for an hour before I started my observations. This maybe why they were lying down.	IMG 3366,67,70,76.
MG - OBS02	14h25	466760 5613967	MG	Visual	3	"	The nanny started feeding and the subadult and yearling remained lying down. The nanny was feeding on new alder leaves.	This nanny seems to have a sharper curve on her left horn compared to the right.	IMG 3382,3383,3388

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): Anne Sutherland

Date (YYYY-MM-DD): 2015-05-18

Weather (*cloud cover,* precipitation *and temperature*): 12C, in am. Sunny, 10% cloud

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Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates *(approximate center of observation area)*	Daily Start Time *(24hr clock)*	Daily End Time *(24hr clock)*
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	11h50	13h40
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	09h05	11h10
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	14h00	15h30

Daily form #	1	of	1

If more space is needed in the below table, please fill out additional daily forms and indicate total number of forms above.

Observation Site *(indicate if location other than OBS site)*	Time *(use 24hr clock)*	UTM Coordinates or Waypoint *(10U)*	Species Observed *(indicate Mountain Goat or other species)*	Observations *(be specific - visual sign, track, other sign)*	Total # of Animals	Age/Sex *(if unknown - refer to attached info sheet)*	Description of Activities *(feeding, moving, etc.)*	Comments *(habitat, snow conditions, etc.)*	Photo #s
MG - OBS02	10h00	466760 5613967	MG	Visual	3	Nanny Yearling SubAdult, "patch"	Moving from top left forest edge down into scree slope, crossed over to the top of the next forest edge. "'Patch" led the way with yearling then nan	They seemed energetic walking and bounding across slope. Yearling going slow, nanny pushed him, then they ran for about 30m. Stood at forest..	Img 3413 3403
MG - OBS02	10h15	"	"	"	"	"	Now they are resting. Patch is out of sight. Yearling is resting about 20m above the nanny.	...edge , then nanny bounded down to sleeping spot. She threw her head up and down at patch who cleared away. Nanny lay down and rolled around. Nap	Img 3409
MG - OBS01	12h00	467898 5612845	N/a	N/a	N/a	N/a	N/a	No goats visible	N/a
MG - OBS03	14h15	469155 5614960	MG	Visual	2	Adults Too far away to see horns	Feeding close to the snow line.	Didn't see any goats on the grey/ red rock face. These goats must be the same 2 goats I saw yesterday. They are staying up higher,	Img 3421

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): Anne Sutherland

Date (YYYY-MM-DD): 2015-05-19

Weather (*cloud cover,* precipitation *and temperature*): Clear, sunny, cool in am., hot in pm.

sartori environmental services

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Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates *(approximate center of observation area)*	Daily Start Time *(24hr clock)*	Daily End Time *(24hr clock)*
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	08h45	11h20
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	11h40	14h15
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	14h30	16h00

Daily form #	1	of	1

If more space is needed in the below table, please fill out additional daily forms and indicate total number of forms above.

Observation Site *(indicate if location other than OBS site)*	Time *(use 24hr clock)*	UTM Coordinates or Waypoint *(10U)*	Species Observed *(indicate Mountain Goat or other species)*	Observations *(be specific - visual sign, track, other sign)*	Total # of Animals	Age/Sex *(if unknown - refer to attached info sheet)*	Description of Activities *(feeding, moving, etc.)*	Comments *(habitat, snow conditions, etc.)*	Photo #s
MG - OBS01	08h50	N/a	N/a	N/a	N/a	N/a	N/a	Presence of a red helicopter flying up river in the direction of the fall? It past again above the FSR (45km hairpin turn) going south. Was close to ground.	
MG - OBS01	11h20	467898 5612845	N/a	N/a	N/a	N/a	N/a	No goats visible	
MG - OBS02	12h07	466760 5613967	MG	Visual	1	U/k sex sub-adult	Resting by orange ribbon sleeping spot.It remained lying down during and after the blast. During the blast it lifted its head quickly!	Blast at 12h07 goat had been looking in my direction. I heard no warning signal, just the blast. It lifted its head and ears perked forward = vigilance (Stage II)	
MG - OBS03	14h40	469155 5614960	MG	Visual	2	Adults Unknown sex Too far away	Initially resting, then a helicopter flew over my location and they then got up = vigilance (Stage II) After it flew by they started feeding.	One goat was energetic for about 5 minutes in the snow. Tossing its head and doing 360's three times. Rubbing his sides and thrashing at the dirt.	

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): Anne Sutherland

Date (YYYY-MM-DD): 2015-05-20

Weather (*cloud cover*, precipitation *and temperature*): Sunny, wind 3-5 km,

sartori environmental services

106-185 forester street, north vancouver, bc v7h 0a6
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Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates *(approximate center of observation area)*	Daily Start Time *(24hr clock)*	Daily End Time *(24hr clock)*
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	14h00	15h40
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	10h30	13h35
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	08h45	10h15

Daily form #	1	of	1

If more space is needed in the below table, please fill out additional daily forms and indicate total number of forms above.

Observation Site *(indicate if location other than OBS site)*	Time *(use 24hr clock)*	UTM Coordinates or Waypoint *(10U)*	Species Observed *(indicate Mountain Goat or other species)*	Observations *(be specific - visual sign, track, other sign)*	Total # of Animals	Age/Sex *(if unknown - refer to attached info sheet)*	Description of Activities *(feeding, moving, etc.)*	Comments *(habitat, snow conditions, etc.)*	Photo #s
MG - OBS03	09h20	469155 5614960	MG	Visual	1	Adult Too far away to see horns, sex unknown	Resting on the forest edge along the right side of the grey /red rock face.	Been unable to see a goat at this location for the last few days. It must have been in the treed area out of site.	
MG - OBS03	09h50	469155 5614960	MG	Visual	1	Adult Possibly billy based on dirt markings.	Feeding lower down from where it was yesterday. No sign of other goat that I saw yesterday.	Pumice road busy with trucks had to leave early.	
MG - OBS02	13h30	466760 5613967	None	N/a	N/a	N/a	N/a	Blasting took place at 13h20. No goats were spotted at all today in this location. Monitor could hear and feel the blast.	
MG - OBS01	15h30	467898 5612845	None	N/a	N/a	N/a	N/a	No goats visible in the area.	

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): Anne Sutherland

Date (YYYY-MM-DD): 2015-05-21

Weather (*cloud cover,* precipitation *and temperature*): Sunny, light wind, 20% cloud

sartori environmental services

106-185 forester street, north vancouver, bc v7h 0a6
office tel 987.5588 fax 987.7740

Please submit **Mountain Goat Daily Observation Form** in person to a representative of Sartori Environmental Services (**Tom Hicks** or **Stephen Sims**) or by email to **tom@sartorienv.com** following each day of monitoring.

Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates *(approximate center of observation area)*	Daily Start Time *(24hr clock)*	Daily End Time *(24hr clock)*
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	11h50	13h30
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	08h50	11h00
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	14h00	16h00

Daily form #	1	of	1

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Observation Site *(indicate if location other than OBS site)*	Time *(use 24hr clock)*	UTM Coordinates or Waypoint *(10U)*	Species Observed *(indicate Mountain Goat or other species)*	Observations *(be specific - visual sign, track, other sign)*	Total # of Animals	Age/Sex *(if unknown - refer to attached info sheet)*	Description of Activities *(feeding, moving, etc.)*	Comments *(habitat, snow conditions, etc.)*	Photo #s
MG - OBS02	10h45	466760 5613967	N/a	N/a	N/a	N/a	N/a	No goats visible for 2 nd day.	
MG - OBS01	13h00	467898 5612845	MG	Visual	2	Adult No sex identifyed	Standing and resting	No goats visible at Truckwash, no tracks other than deer. Two goats seen on river right up by the snow line on the red rock.	
MG - OBS01	13h15	467898 5612845	MG	Visual	1	Adult No sex identifyed	Moving and feeding	This goat was on the river right grey rock cliffs.	
MG - OBS03	15h35	469155 5614960	MG	Visual	1	Adult To far away to sex	Walking to the edge of the cliff, then walking back into the forest	Located at the highest spot above the rock face . Heading up the mountain? Snow has melted quickly in the last few days and snow line is just top of	

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): Anne Sutherland and Danita Abraham

Date (YYYY-MM-DD): 2015-05-22

Weather (*cloud cover*, precipitation *and temperature*): 60% cloud cover, warm.

sartori environmental services

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Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates *(approximate center of observation area)*	Daily Start Time *(24hr clock)*	Daily End Time *(24hr clock)*
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845		
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	12:00	13:45
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	09:30	10:55

Daily form #	1	of	3

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Observation Site *(indicate if location other than OBS site)*	Time *(use 24hr clock)*	UTM Coordinates or Waypoint *(10U)*	Species Observed *(indicate Mountain Goat or other species)*	Observations *(be specific - visual sign, track, other sign)*	Total # of Animals	Age/Sex *(if unknown - refer to attached info sheet)*	Description of Activities *(feeding, moving, etc.)*	Comments *(habitat, snow conditions, etc.)*	Photo #s
Spur rd on pumice rd tracking site	09:43	10U 467176 564011	MG	Track	1	Unknown age and sex	Walking towards salal	Heal to heal is 101cm	
MG -OBS02	10:30	10U 469155 5614960	MG	Visual	1	Adult Sex unknown	Laying down	On rocky bluff in snow line	
MG - OBS02	10:47	10U 469155 5614960	MG	Visual	1	Adult Sex unknown	Feeding on rocky area	Rocky area in snow line with des treas	
Tracking site @ 47km spur rd south side	11:18	10U 466700 564247	MG	Track	1	Sex and age unknown	Walking downhill towards keyhole	Pics on cell	

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): Danita Abraham and Anne Sutherland

Date (YYYY-MM-DD): 2015-05-22

Weather (*cloud cover,* precipitation *and temperature*): Sunny, hazy and hot, very little wind

sartori environmental services

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Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates *(approximate center of observation area)*	Daily Start Time *(24hr clock)*	Daily End Time *(24hr clock)*
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	14:00	15:00
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	12:00	13:45
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960		

Daily form #	2	of	3

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Observation Site *(indicate if location other than OBS site)*	Time *(use 24hr clock)*	UTM Coordinates or Waypoint *(10U)*	Species Observed *(indicate Mountain Goat or other species)*	Observations *(be specific - visual sign, track, other sign)*	Total # of Animals	Age/Sex *(if unknown - refer to attached info sheet)*	Description of Activities *(feeding, moving, etc.)*	Comments *(habitat, snow conditions, etc.)*	Photo #s
MG - OBS02	12:00	466760 5613967	MG	Visual	2	1 subadult with horns longer than ears, sex unknown Yearling sex unknown	First observation showed 2 resting under the orange ribbon. Then they got up walked to forest briefly browsed. Sub pushed yearling	Off the edge down the ridge. Sub left and yearling ate some leaves. Sub came back , then they went down the ridge back to resting spot.	Img 1-4
MG - OBS02	12:30	466760 5613967	MG	Visual	1	Adult, nanny	Came to the forest edge and looked at other goats. Then moved up slope along the forest edge feeding. Squatted to urinate.	Moved out of site into the forest. Sub remained at resting spot. Yearling is out of sight probably on the other side of the ridge. Nanny maybe isolating herself.	Img 5-7
MG - OBS02	12:45	466760 5613967	MG	Visual	3	Same goats as above	Patch came out at the forest edge above. Watching for other 2 goats. Patch made its way down the forest edge and spent time looking in the	When the sub and yearling arrived the other sub went into the trees and patch and the yearling were challenging each other.	Img 8-15
MG -OBS 01	14:00	467898 5612845	None	N/A	0	N/A	N/A	No sightings	

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): Anne Sutherland and Danita Abraham

Date (YYYY-MM-DD): 2015-05-22

Weather (*cloud cover*, precipitation *and temperature*): Sunny, hazy, warm

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MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845		
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	16:30	17:10
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960		

Daily form #	3	of	3

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MG - OBS02	16:40	466760 5613967	MG	Visual	1	Unknown age and sex	Laying down	Under ribbon on bedding area	
MG - OBS02	16:45	466760 5613967	MG	Visual	1	Subadult Patch Billy?	Came out from brush just behind bedding area looking down the slope.	Started moving down slope after a few minutes.	Camera 609-610
MG - OBS02	16:53	466760 5613967	MG	Visual	3	Yearling sex unk Subadult patch billy? Nanny age unknown	Moving down slope away from obs point	Moved out of site over a ridge in forested area Before blast at 17:00. Blast heard at monitoring site. No goats observed at time of blast,	

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): Danita Abraham

Date (YYYY-MM-DD): 2015-05-23

Weather (*cloud cover,* precipitation *and temperature*): overcast, mild

sartori environmental services

106-185 forester street, north vancouver, bc v7h 0a6
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MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	10h45	12h45
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	08h45	10h30

Daily form #	1	of	1

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MG -OBS03	09h20	469155 5614960	MG	Visual	2	Adult Sex unknown	One laying down, the other feeding in and out of forest line just above resting goat	They are near the top of the rock face along tree line Left early seen a brown bear on the little mountain in front of me kept moving down closer. Pic 61	611
MG - OBS02	11h44	466760 5613967	MG	Visual	1	Adult nanny	She came from the forest to the far right of slide. She moved very quickly to the mineral slide running and stopping to look around.	She laid down once on her way this way under the dark grey mineral lick. She got up and moved closer to the area they rest occasionally. Laying down	613-628
-	-	-	-	-	-	-	This behaviour could not be accounted for and was not caused by construction activities. No blasts or helicopters were heard.	Her breathing seems very laboured. She stood up and turned away and laid down. Pic#629 is where she is. -	629
MG - OBS01	13h15	467898 5612845	Nine	N/A	0	N/A	N/A	N/A	-